

## C L A I M S

What is claimed and desired to secure by Letters Patent is:

1. A single pass process for forming a yard sign and comprising the steps of:
  - (a) printing an image on a first side of a two sided sheet of a sign stock coated with a fusible material on at least a second side of said sheet opposite said first side;
  - (b) folding said sheet in half to form a folded sheet with said second side on an inside of said folded sheet and said first side on an outside of said folded sheet; said folded sheet having a folded edge, an end edge opposite said folded edge, and opposite side edges extending respectively between said folded edge and said end edge; and
  - (c) applying an energy to each of said side edges of said folded sheet to fuse said fusible material along said side edges to thereby adhere or seal portions of said sheet at said side edges together to form a pocket within said folded sheet to receive a sign support member.

2. A process as set forth in Claim 1 and including the step of:
  - (a) providing said sheet of sign stock with a coating of said fusible material on both said first side and said second side of said sheet.
3. A process as set forth in Claim 1 and including the step of:
  - (a) providing said sheet of sign stock with a coating of a fusible polymer on both said first side and said second side of said sheet.
4. A process as set forth in Claim 1 and including the step of:
  - (a) providing said sheet of sign stock with a coating of polyethylene of a first thickness on said first side of said sheet and a coating of polyethylene of a second thickness greater than said first thickness on said second side of said sheet.

5. A process as set forth in Claim 1 and including the steps of:
  - (a) printing said image as an ink pattern on said sheet using a screen printing process; and
  - (b) curing said ink pattern using ultraviolet light.
6. A process as set forth in Claim 1 and including the step of:
  - (a) scoring said sheet to form a fold line along said sheet prior to folding the scored sheet.

7. A process as set forth in Claim 1 and including the steps of:
- (a) scoring said sheet to form a fold line along said sheet prior to folding the scored sheet;
  - (b) providing a folding mechanism including a parallel pair of nip rollers and a folding knife positioned to urge a sheet into engagement with said nip rollers;
  - (c) conveying said scored sheet to a position at which said fold line is aligned with said folding knife;
  - (d) extending said folding knife toward said scored sheet to urge said sheet at said fold line into engagement with said nip rollers; and
  - (e) rotating said nip rollers to propel said scored sheet between said nip rollers to thereby fold said scored sheet at said fold line.
8. A process as set forth in Claim 1 wherein said heating step includes the step of:
- (a) ultrasonically heating said side edges to fuse said fusible material.

9. A process as set forth in Claim 1 wherein said heating step includes the steps of:
- (a) providing a pair of parallel nip rollers;
  - (b) providing a pair of sets of an ultrasonic horn and an ultrasonic anvil, said sets being positioned in a selected spaced relation to said nip rollers and being spaced apart substantially equal to a distance between said side edges;
  - (c) urging said folded sheet into engagement with said nip rollers; and
  - (d) propelling said folded sheet by said nip rollers through said sets of an ultrasonic horn and an ultrasonic anvil whereby each ultrasonic horn heats a respective side edge of said folded sheet.
10. A yard sign formed by the process of Claim 1.

11. A single pass process for forming a yard sign comprising the steps of:
- (a) printing an image on a first side of a two sided a sign stock sheet at least partially coated with a fusible material on at least a second side thereof;
  - (b) folding said sheet to form a folded sheet with said second side at least partially facing inwardly on itself and said first side facing outwardly;
  - (c) said folding forming a folded edge and end edges opposite said folded edge, said folding also forming pairs of opposite side edges extending respectively between said folded edge and said end edges; and
  - (d) applying heat to said first side near said side edges thereby fusing said fusible material near and along said side edges thereby adhering portions of said sheet at or near said side edges together, forming a pocket within said folded sheet to receive a sign support member.

12. The process of producing a yard sign using a sign stock sheet comprising the steps of:

- (a) at least partially coating said sheet on at least one side thereof with a fusible material;
- (b) printing an image on a second side of said sheet forming an image side;
- (c) folding said sheet producing a fold line and forming a folded sheet with said image side facing outwardly and said one side at least partially facing inwardly on itself;
- (d) said folding producing overlapping side edges on said sheet;
- (e) continuously driving said sheet from folding into a heating zone; and
- (f) heating said side edges to cause fusing, thereby producing a pocket for receiving a sign support.

13. A single pass process for forming a yard sign and comprising the steps of:

- (a) screen printing an image on an image side of a two sided sheet of a sign stock coated with a fusible polymer;
- (b) scoring said sheet to form a fold line along said sheet;
- (c) folding said sheet in half at said fold line to form a folded sheet with said image side on an outside of said folded sheet; said folded sheet having a folded edge, an end edge opposite said folded edge, and opposite side edges extending respectively between said folded edge and said end edge; and
- (d) ultrasonically heating each of said side edges of said folded sheet to fuse said fusible polymer along said side edges to thereby adhere portions of said sheet at said side edges together to form a pocket within said folded sheet to receive a sign support member.



14. A process as set forth in Claim 13 and including the steps of:

- (a) printing said image as an ink pattern on said sheet; and
- (b) curing said ink pattern using ultraviolet light.

15. A process as set forth in Claim 13 and including the steps of:

- (a) providing a folding mechanism including a parallel pair of nip rollers and a folding knife positioned to urge a sheet into engagement with said nip rollers;
- (b) conveying the scored sheet to a position which aligns said fold line with said folding knife;
- (c) extending said folding knife toward said scored sheet to urge said sheet at said fold line into engagement with said nip rollers; and
- (d) rotating said nip rollers to propel said scored sheet between said nip rollers to thereby fold said scored sheet at said fold line.

16. A process as set forth in Claim 15 wherein said heating step includes the steps of:

- (a) providing a pair of sets of an ultrasonic horn and an ultrasonic anvil, said sets being positioned in a selected spaced relation to said nip rollers and being spaced apart substantially equal to a distance between said side edges; and
- (b) propelling said folded sheet by said nip rollers through said sets of an ultrasonic horn and an ultrasonic anvil whereby each ultrasonic horn heats a respective side edge of said folded sheet.

17. A process as set forth in Claim 16 wherein said pair of nip rollers are a pair of first nip rollers and including the steps of:

- (a) providing a parallel pair of second nip rollers positioned in spaced relation to said first nip rollers with the ultrasonic horns and anvils positioned between said first nip rollers and said second nip rollers;
- (b) engaging said folded sheet with said second nip rollers subsequent to said folded sheet being propelled through said sets of said ultrasonic horns and anvils; and
- (c) propelling said folded sheet by said second nip rollers to a stacking station.

18. A yard sign formed by the process of Claim 13.

19. A single pass process for forming a yard sign and comprising the steps of:
- (a) screen printing an image on an image side of a two sided sheet of a sign stock coated with a fusible polymer, said printing step including the steps of:
    - (1) printing said image as an ink pattern on said image side of said sheet; and
    - (2) curing said ink pattern using ultraviolet light;
  - (b) scoring said sheet to form a fold line along said sheet;
  - (c) folding said sheet in half at said fold line to form a folded sheet with said image side on an outside of said folded sheet; said folded sheet having a folded edge, an end edge opposite said folded edge, and opposite side edges extending respectively between said folded edge and said end edge, said folding step including the steps of:
    - (1) providing a folding mechanism including a parallel pair of nip rollers and a folding knife positioned to urge a sheet into engagement with said nip rollers;

- (2) conveying the scored sheet to a position which aligns said fold line with said folding knife;
  - (3) extending said folding knife toward said scored sheet to urge said sheet at said fold line into engagement with said nip rollers; and
  - (4) rotating said nip rollers to propel said scored sheet between said nip rollers to thereby fold said scored sheet at said fold line; and
- (d) ultrasonically heating each of said side edges of said folded sheet to fuse said fusible polymer along said side edges to thereby adhere portions of said sheet at said side edges together to form a pocket within said folded sheet to receive a sign support member, said heating step including the steps of:
- (1) providing a pair of sets of an ultrasonic horn and an ultrasonic anvil, said sets being positioned in a selected spaced relation to said nip rollers and being spaced apart

substantially equal to a distance between  
said side edges; and

- (2) propelling said folded sheet by said nip  
rollers through said sets of an ultrasonic  
horn and an ultrasonic anvil whereby each  
ultrasonic horn heats a respective side edge  
of said folded sheet.

20. A process as set forth in Claim 19 and including the  
step of:

- (a) providing said sheet of said sign stock which has  
a coating of polyethylene with a thickness of  
approximately 0.5 mil on said image side of said  
sheet and a coating of polyethylene with a  
thickness of approximately 0.875 mil on a side of  
said sheet opposite said image side.

21. A process as set forth in Claim 19 wherein said pair of nip rollers are a pair of first nip rollers and including the steps of:

- (a) providing a parallel pair of second nip rollers positioned in spaced relation to said first nip rollers with the ultrasonic horns and anvils positioned between said first nip rollers and said second nip rollers;
- (b) engaging said folded sheet with said second nip rollers subsequent to said folded sheet being propelled through said sets of said ultrasonic horns and anvils; and
- (c) propelling said folded sheet by said second nip rollers to a stacking station.

22. A yard sign formed by the process of Claim 19.

23. A single pass apparatus for forming a yard sign and comprising:

- (a) a screen printing station receiving a two sided sheet of a sign stock coated with a fusible polymer and screen printing an image on an image side of said sheet;
- (b) a scoring station receiving said sheet from said printing station and having a set of scoring members to score said sheet to form a fold line along said sheet;
- (c) a folding mechanism receiving said sheet from said scoring members and folding said sheet at said fold line to form a folded sheet with said image side on an outside of said folded sheet; said folded sheet having a folded edge, an end edge opposite said folded edge, and opposite side edges extending respectively between said folded edge and said end edge; and
- (d) a sealing station receiving said folded sheet from said folding mechanism and ultrasonically heating each of said side edges of said folded sheet to fuse said fusible polymer along said side edges to thereby adhere portions of said sheet at said side



edges together to form a pocket within said folded sheet to receive a sign support member.

24. An apparatus as set forth in Claim 23 and including:

- (a) a curing station positioned between said printing station and said scoring station and including an ultraviolet lamp positioned and oriented to radiate ultraviolet light onto said image side of said sheet to cure said image on said sheet.

25. An apparatus as set forth in Claim 23 wherein:

- (a) said folding mechanism includes a parallel pair of nip rollers and a folding knife positioned to urge said sheet into engagement with said nip rollers;
- (b) said folding knife being extended toward the scored sheet to urge said sheet at said fold line into engagement with said nip rollers; and
- (c) said nip rollers being rotated to propel said scored sheet between said nip rollers to thereby fold said scored sheet at said fold line.

26. An apparatus as set forth in Claim 25 wherein:

- (a) said sealing station includes a pair of sets of an ultrasonic horn and an ultrasonic anvil, said sets being positioned in a selected spaced relation to said nip rollers and being spaced apart substantially equal to a distance between said side edges; and
- (b) said nip rollers propelling said folded sheet through said sets of an ultrasonic horn and an ultrasonic anvil whereby each ultrasonic horn heats a respective side edge of said folded sheet.

27. An apparatus as set forth in Claim 26 wherein said pair of nip rollers are a pair of first nip rollers and including:

- (a) a stacking station positioned downstream of said sealing station, said stacking station receiving said folded sheet from said sealing station and storing a plurality of the folded sheets;
- (b) a parallel pair of second nip rollers positioned in spaced relation to said first nip rollers with the ultrasonic horns and anvils positioned between said first nip rollers and said second nip rollers;
- (c) said second nip rollers engaging said folded sheet subsequent to said folded sheet being propelled through said sets of said ultrasonic horns and anvils; and
- (d) said second nip rollers propelling said folded sheet to said stacking station.